UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,059	01/22/2004	Yoshihiko Kuroki	S1459.70077US00	3714

7590 08/24/2010

Randy J. Pritzker
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, MA 02210

EXAMINER	
CHEN, CHIA WEI A	

ART UNIT	PAPER NUMBER
2622	

MAIL DATE	DELIVERY MODE
08/24/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 10/763,059	**Applicant(s)** KUROKI ET AL.	
	Examiner CHIA-WEI A. CHEN	**Art Unit** 2622	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 17 August 2010 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

   a) ☐ The period for reply expires ______months from the mailing date of the final rejection.

   b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: _____.
   Claim(s) objected to: _____.
   Claim(s) rejected: *1-10,21 and 37*.
   Claim(s) withdrawn from consideration: *11-20 and 22-36*.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/Lin Ye/
Supervisory Patent Examiner, Art Unit 2622

/C. A. C./
Examiner, Art Unit 2622

Continuation of 11. does NOT place the application in condition for allowance because: Applicant argues with respect to independent claims 1, 10, 21, and 37 that the combination of Anderson with MacAulay and Holzbach does not teach the claimed invention, and that the expectation of success is absent in the asserted combination. Specifically, Applicant argues that "if the multiple angle micromirror of Anderson was used in the microscope of MacAulay, light from source 4 of MacAulay would not be incident on sample 30, except at one angle of the micromirrors which corresponds to the 'on' position taught by MacAulay."
However, Examiner respectfully disagrees. MacAulay teaches that the "modulator controller selects a plurality of desired angles of illumination of the sample such that the plurality of angles of illumination of the sample such that the plurality of images of the sample at a corresponding plurality of different depths are obtained without moving the sample, a condenser lens, or an objective lens;" see col. 4, lines 47-51. That is, the incoming angles of light to be incident on the sample are selected by a computer-implemented program (col. 4, lines 31-32) from a single light source 4 via a spatial light modulator to impinge at different portions of the sample in order to capture a plurality of different images of the sample, so that the sample can be recreated three-dimensionally. Since MacAulay does not expressly teach a structure of a spatial light modulator capable of changing the angles of light (although MacAulay teaches the method, MacAulay does not disclose in detail of the spatial light modulator to perform this function), Anderson is used to teach this specific structure of a spatial light modulator. Therefore, Applicant's assertion that a multiple angle micromirror of Anderson can project light to be incident on the sample at only one angle is incorrect. Thus, the rejections of the pending claims are sustained.

As to independent claim 1, MacAulay teaches a three-dimensional image pickup apparatus in Fig. 3, comprising:

o a plurality of light receiving elements for receiving and converting light into an electric signal (light detector 26 that comprises an array of individual detection pixels; col. 17, lines 46-50); and

o a plurality of light path selection elements for selecting different incoming angles of light to come to said light receiving elements at different times (spatial light modulator, e.g. digital micromirror device 34; col. 16, line 62-col. 17, line 9);

o said light receiving elements and said light path selection elements being arranged such that a plurality of pixels formed from said light receiving elements and said light path selection elements are disposed both in a row direction and a column direction (detection array and SLM array are aligned with each other; col. 17, lines 55-58, Fig. 4;

o intensities of the light received by said light receiving elements and the corresponding different incoming angles of light selected by said light path selection elements at different times being recorded in a coordinated relationship for the individual pixels, the recorded light intensities representing different image received by said light receiving elements at different incoming angles of light and at different times, wherein a three- dimensional image including the different images is provided when the recorded light intensities are reproduced (Controller compiles data obtained from the detector to reconstruct images. This would require the recording of the coordinated relationships of the angles of the SLMs and the intensity of light received by the light detector; col. 16, lines 10-12, col. 22, lines 40-57; col. 7, lines 60-col. 8, line 1; col. 23, lines 58-67; col. 24, lines 18-39);

MacAulay does not expressly teach that each light path selection element of said plurality of light path selection elements configured to select different incoming angles of light to come to said light receiving elements at different times to record different images at the different incoming angles of light; and that when the different images are reproduced by emitting light representing the different images at different outgoing angles of light and at different times, the different images are perceived by a viewer as a three-dimensional image and are perceived by the viewer as a different three-dimensional image when the viewer observes the different images from a different direction.

Holzbach teaches that different images (full parallax 3D images; col. 9, lines 29-32) are reproduced by emitting light (LEDs in the lenslet projector modules; col. 9, lines 5-7) representing the different images at different outgoing angles of light (lenslet contains elements to direct light in the appropriate direction to create the parallax image; see also DMD of col. 9, lines 7-8) and at different times (inherent in a moving picture display; col. 9, lines 20-23), the different images are perceived by a viewer as a three-dimensional image and are perceived by the viewer as a different three-dimensional image (full parallax 3D images) when the viewer observes the different images from a different direction (inherent in an autostereoscopic parallax display; i.e., the depth resolution changes as the viewing position changes. "An autostereoscopic display allows an observer to move around within a wide range of viewing positions, always presenting the correct information to the observer's eyes." See col. 5, lines 21-24.).

It would have been obvious to a person having ordinary skill in the art to have used the teaching of Holzbach with that of MacAulay in order to provide a system to present 3D information to an individual or group of observers without requiring each observer to wear special goggles or glasses. (See col. 2 , lines 40-49 of Holzbach.)

MacAulay in view of Holzbach does not expressly teach that each light path selection element of said plurality of light path selection elements configured to select different incoming angles of light to come to said light receiving elements at different times to record different images at the different incoming angles of light.

Anderson teaches a plurality of light path selection elements (an optical micromirror system 200 with a plurality of micromirrors 216) configured to select different incoming angles of light to be directed to a particular output depending on the voltage applied to the micromirror actuator (light is deflected according to the tilt position of a micromirror 216; col. 7, lines 33-57 and Figs. 2-3).
It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the micromirror system of Anderson with the pickup apparatus and digital micromirror device of MacAulay to select different incoming angles of light to come to said light receiving elements at different times to record different images at the differing incoming angles of light in to allow each micromirror to assume a wide variety of alignment positions as well as to overcome stiction in a MEMS device. (See col. 6, lines 3-5 and 17-19 of Anderson.)

As to independent claim 10, MacAulay teaches a three-dimensional image pickup apparatus, comprising:

o light intensity acquisition means for acquiring intensity information of received light (intensity of the light impinging on individual pixels in the detection array can be detected; col. 22, lines 44-45); and

o incoming angle acquisition means for acquiring corresponding incoming angle information of the received light at different incoming angles and at different times (controller varies the orientation of the SLM and illuminates the object from a plurality of angles; col. 22, lines 40-45, col. 16, line 62-col. 17, line 9); the

o intensity information and the corresponding incoming angle information of the light being recorded in a coordinated relationship with each other the recorded intensity information representing different images received by said light intensity acquisition means at different incoming angles and at different times, wherein a three- dimensional image including the different images is provided when the recorded intensity information is reproduced (It is inherent that the intensity information and the incoming information be recorded in a coordinated relationship with each other in order to be reconstructed as an 3-D image of the sample; col. 22, lines 45-50; col. 7, lines 60-col. 8, line 1; col. 23, lines 58-67; col. 24, lines 18-39)

but does not expressly teach when the different images are reproduced by emitting light representing the different images at different outgoing angles of light and at different times, the different images are perceived by a viewer as a three-dimensional image and are perceived by the viewer as a different three-dimensional image when the viewer observes the different images from a different direction.

Holzbach teaches that different images (full parallax 3D images; col. 9, lines 29-32) are reproduced by emitting light (LEDs in the lenslet projector modules; col. 9, lines 5-7) representing the different images at different outgoing angles of light (lenslet contains elements to direct light in the appropriate direction to create the parallax image; see also DMD of col. 9, lines 7-8) and at different times (inherent in a moving picture display; col. 9, lines 20-23), the different images are perceived by a viewer as a three-dimensional image and are perceived by the viewer as a different three-dimensional image (full parallax 3D images) when the viewer observes the different images from a different direction (inherent in an autostereoscopic parallax display; i.e., the depth resolution changes as the viewing position changes. "An autostereoscopic display allows an observer to move around within a wide range of viewing positions, always presenting the correct information to the observer's eyes." See col. 5, lines 21-24.). See the rationale to combine in the analysis of claim 1.

MacAulay in view of Holzbach does not expressly teach that each light path selection element of said plurality of light path selection elements configured to select different incoming angles of light to come to said light receiving elements at different times to record different images at the different incoming angles of light.

Anderson teaches a plurality of light path selection elements (an optical micromirror system 200 with a plurality of micromirrors 216) configured to select different incoming angles of light to be directed to a particular output depending on the voltage applied to the micromirror actuator (light is deflected according to the tilt position of a micromirror 216; col. 7, lines 33-57 and Figs. 2-3).

It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the micromirror system of Anderson with the pickup apparatus and digital micromirror device of MacAulay to select different incoming angles of light to come to said light receiving elements at different times to record different images at the differing incoming angles of light in to allow each micromirror to assume a wide variety of alignment positions as well as to overcome stiction in a MEMS device. (See col. 6, lines 3-5 and 17-19 of Anderson.)

As to independent claim 21, Holzbach teaches a three-dimensional image pickup and display apparatus in Fig. 14, comprising:

o a light reception section (detector element 172) including a plurality of light receiving elements for receiving and converting light into an electric signal and

o said light receiving elements and said first light path selection elements being arranged such that a plurality of pixels formed from said light receiving elements and said first light path selection elements are disposed both in a row direction and a column direction (col. 10, line 47),

o a light emission section (LED) including a plurality of light emitting elements for emitting light in accordance with an electric signal and a

o plurality of second light path selection elements (light modulator DMD) for selecting corresponding different outgoing angles of light to be emitted from said light emitting elements at different times (col. 10, lines 47-62),

o said light emitting elements and said second light path selection elements being arranged such that a plurality of pixels formed from said light emitting elements and said second light path selection elements are disposed both in a row direction and a column direction (col. 9, lines 9-15),

o said light emitting elements emitting light in accordance with a coordinated relationship between the corresponding different outgoing angles of light selected by said second light path selection elements at different times and the intensities of light for the individual pixels based on the video signals to produce a three-dimensional image including the different images at the corresponding different outgoing angles of light and at different times (control both light intensity and light directions; col. 5, lines 13-17);

o to reproduce the different images at different outgoing angles of light (lenslet contains elements to direct light in the appropriate direction to create the parallax image; see also DMD of col. 9, lines 7-8) and at different times (inherent in a moving picture display; col. 9, lines 20-23), wherein the different images are perceived by a viewer as a three-dimensional image (full parallax 3D images) and are perceived by the viewer as a different three-dimensional image when the viewer observes the different images from a different direction (inherent in an autostereoscopic parallax display; i.e., the depth resolution changes as the viewing position changes. "An autostereoscopic display allows an observer to move around within a wide range of viewing positions, always presenting the correct information to the observer's eyes." See col. 5, lines 21-24.);

but does not expressly teach:

o a plurality of first light path selection elements for selecting different incoming angles of light to come to said light receiving elements at different times,

o intensities of the light received by said light receiving elements and the corresponding different incoming angles of light selected by said first light path selection elements at different times being coordinated with each other for the individual pixels to form video signals that represent different images received by said light receiving elements at different incoming angles of light and at different times.

MacAulay teaches

o a plurality of first light path selection elements for selecting different incoming angles of light to come to said light receiving elements at different times (spatial light modulator, e.g. digital micromirror device 34, col. 16, line 62-col. 17, line 9), and

o intensities of the light received by said light receiving elements and the corresponding different incoming angles of light selected by said first light path selection elements at different times being coordinated with each other for the individual pixels to form video signals that represent different images received by said light receiving elements at different incoming angles of light and at different times (Controller compiles data obtained from the detector to reconstruct images. This would require the recording of the coordinated relationships of the angles of the SLMs and the intensity of light received by the light detector; col. 16, lines 10-12, col. 16, line 62-col. 17, line 9, col. 22, lines 40-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the light path selection elements of MacAulay with the apparatus of Holzbach to provide a significant advantage in controlling the angle of illumination, quantity of light, and the location of light reaching the detector. (See col. 2, lines 54-64 of MacAulay.)

Holzbach in view of MacAulay does not expressly teach that each first light path selection element of said plurality of first light path selection elements configured to select different incoming angles of light to come to said first light receiving elements at different times to record different images at the different incoming angles of light and that each second light path selection element of said plurality of second light path selection elements configured to select different outgoing angles of light to be emitted from said light emitting elements at different times.

Anderson teaches a plurality of light path selection elements (an optical micromirror system 200 with a plurality of micromirrors 216) configured to select different incoming angles of light to be directed to a particular output depending on the voltage applied to the micromirror actuator (light is deflected according to the tilt position of a micromirror 216; col. 7, lines 33-57 and Figs. 2-3).

It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the micromirror system of Anderson with the digital micromirror devices of Holzbach and MacAulay to select different incoming angles of light to come to said light receiving elements at different times to record different images at the differing incoming angles of light in to allow each micromirror to assume a wide variety of alignment positions as well as to overcome stiction in a MEMS device. (See col. 6, lines 3-5 and 17-19 of Anderson.)

Independent claim 37 is analyzed as an information recording method of the apparatus of claim 10.

.